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LIVESTOCK TRAMPLING AND *LILAEOPSIS SCHAFFNERIANA* VAR. *RECURVA* (BRASSICACEAE)

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Lilaeopsis schaffneriana var. *recurva* (Hill) Affolter, is a small aquatic to semi-aquatic plant restricted to mid-elevation cienega and riparian margins in southeastern Arizona and northwestern Sonora (Hendrickson and Minckley 1984). It was listed as Endangered in 1997 under the Endangered Species Act of 1973 (as amended) because of "degradation and destruction of habitat resulting from livestock overgrazing, water diversions, dredging, and groundwater pumping" (USFWS 1997). Trampling and overgrazing by livestock are commonly cited as threats to this species, however, we have found no documented cases or quantification of livestock effects. Herein, we document and quantify the effect of trampling by trespass livestock on *Lilaeopsis schaffneriana* var. *recurva* in Leslie Canyon National Wildlife Refuge, Cochise County, Arizona.

During 2003, we established a pilot monitoring program for *Lilaeopsis schaffneriana* var. *recurva*, which occupied 12 distinct patches in Leslie Canyon National Wildlife Refuge. The protocol required taking multiple, cross-patch measurements of each patch and plotting the measurements on simplified drawings of the patches. The diagrams were then taken back to the lab, scaled polygons were drawn in TurboCAD (IMSI 2002), and from these polygons the area of each patch was estimated. The sum of the individual patch areas is the total area occupied. The trampling effect of trespass livestock was assessed in the same manner, where portions of patches destroyed by livestock were measured, described as polygons with area calculations, and summed across all trampled areas.

All patch measurements were completed on 13 Jun 2003. Total area occupied by ten *Lilaeopsis schaffneriana* var. *recurva* patches along Leslie Creek was 27.11 m^2; individual patches averaged 2.71 m^2 (SD = 2.54). On 6 Jul 2004, a trespass bull entered Leslie Canyon National Wildlife Refuge and spent 4 d within the riparian area; it appeared that most of the individual's time was spent away from the *Lilaeopsis* patches. During the time that the bull spent around the *Lilaeopsis* patches, 1.47 m^2 (5.4% of the total area occupied) were lost to trampling.

This event allowed us to quantify the effect of a single livestock individual on *Lilaeopsis schaffneriana* var. *recurva*, over a span of only 4 d. Even though resource use patterns by livestock could leave some patches unaffected, the damage caused by this single individual indicates that even a small number of livestock could eradicate most of the Leslie Creek *Lilaeopsis* population in several days to weeks. Therefore, based on the negative effect caused by this short-term event, our conclusion is that livestock should be excluded from areas occupied by *Lilaeopsis schaffneriana* var. *recurva*.

Literature Cited

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